Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Canceled)

2. (Canceled)

3. (Canceled)

4. (Canceled)

5. (Canceled)

6. (Canceled)

7. (Currently Amended) An electronic color capture system for capturing a color image and producing an accurate color reproduction of the color image, said system comprising:

a plurality of image sensors for capturing the image and generating a plurality of color image signals from the captured image, each image sensor having predetermined spectral sensitivities defining the spectral response of the image sensor;

an optical section including at least one optical element for directing image light of a particular color content toward each image sensor and at least one cutoff filter in an optical path of each image sensor for filtering the color light content directed upon the respective image sensor, said optical section having spectral characteristics comprised of specific optical element characteristics and specific filter characteristics which together define the spectral response of the optical section;

wherein the spectral responses of the optical section and the image sensors are selected so as to cascade together to provide all-positive, Gaussian system curves modeled upon red, green and blue color matching functions representative of the human visual system and derived from three monochromatic light sources, wherein each of the Gaussian system curves, $F_k(\lambda)$, is described

by parameters $\bar{\lambda}_k$ and σ_k, where $\bar{\lambda}_k$ is the mean value of the Gaussian curve, σ_k is the standard deviation value, and k represents each of the three corresponding color channels (red, green, and blue) as shown in the following equation:

$$F_k(\lambda) = e^{\left(\frac{\lambda-\bar{\lambda}_k}{2\sigma_k}\right)^2}$$

said color matching functions containing no more than three positive lobes as well as one or more negative lobes, and whereby the areas under the color matching functions ~~(a)~~ determined by minimizing both (i) a summation of all negative lobes ~~is minimized~~ and ~~(b) determined by~~ (ii) an overlap between the green and red color matching functions ~~is minimized~~;

a color correction matrix containing matrix coefficients that are selected by minimizing at least two error measuring parameters including one parameter measuring the color difference between the color image signals and the human visual system and the other parameter measuring the level of signal noise in the color image signals; and

a processor for applying the color correction matrix to the color image signals produced by the image sensors, thereby producing an output color image signal exhibiting an accurate color reproduction of the color image.

8. (Original) The system as claimed in claim 7 whereby the conditions that the areas under the color matching functions, as (a) determined by the summation of all negative lobes be minimized and (b) determined by the overlap between the green and red sensitivity curves be minimized, are constrained by the requirement that the largest possible color gamut is maintained in the output color image.

9. (Original) The system as claimed in claim 7 wherein said plurality of image sensors includes three image sensors and the optical element is a beam splitter for directing image light of different color content toward the respective image sensors.

10. (Original) The system as claimed in claim 7 wherein the error measuring parameter measuring the difference between the color image signals and the human visual system is $\overline{\Delta E}^*_{ab}$, which is calculated according to:

$$\overline{\Delta E}^*_{ab} = \frac{\sum_{i=1}^{N} \Delta E^*_{ab.i}}{N}$$

where the color difference value $\Delta E^*_{ab.i}$ for a diagnostic color patch set containing N patches is calculated for the difference between the 1976 CIE $\left(L^* a^* b^*\right)$-space (CIELAB space) coordinates for each patch and the 1976 CIE $\left(L^* a^* b^*\right)$-space coordinates which correspond to a transformation of the exposure signals captured by the image sensors.

11. (Original) The system as claimed in claim 10 wherein $\overline{\Delta E}^*_{ab} \leq 2.5$.

12. (Original) The system as claimed in claim 7 wherein the parameter measuring the level of signal noise in the color image signals is a parameter Ψ_N defined as the sum of the square roots of the sum of the squares of the matrix coefficients of each row in the color correction matrix which transforms the color image signals.

13. (Original) The system as claimed in claim 12 wherein $\Psi_N \leq 3.5$.

14. (Canceled)

15. (Currently Amended) A method for capturing an image and producing an accurate color reproduction of the image, said method comprising the steps of:

providing an imaging section having predetermined spectral sensitivities defining a spectral response of the imaging section, said imaging

section capturing the image and generating a plurality of color image signals from the captured image;

providing an optical section having specific spectral characteristics which define a spectral response of the optical section, said optical section separating the image into its separate color content and directing the separate color content toward said imaging section;

selecting the spectral responses of the optical section and the imaging section so that they cascade together to provide all-positive, ~~symmetrical~~ Gaussian system curves modeled upon red, green and blue color matching functions representative of the human visual system and derived from three monochromatic light sources, wherein each of the Gaussian system curves, $F_k(\lambda)$, is described by parameters $\bar{\lambda}_k$ and σ_k, where $\bar{\lambda}_k$ is the mean value of the Gaussian curve, σ_k is the standard deviation value, and k represents each of the three corresponding color channels (red, green, and blue) as shown in the following equation:

$$F_k(\lambda) = e^{\left(\frac{\lambda - \bar{\lambda}_k}{2\sigma_k}\right)^2}$$

said color matching functions containing no more than three positive lobes as well as one or more negative lobes, and whereby the areas under the color matching functions ~~(a)~~ determined by minimizing both (i) a summation of all negative lobes ~~is minimized~~ and ~~(b) determined by~~ (ii) an overlap between the green and red color matching functions ~~is minimized~~; and

processing the color image signals with a color correction matrix having coefficients optimized for signal-to-noise performance for producing an output color image from the color image signals exhibiting an accurate color reproduction of the color image.

16. (Original) The method as claimed in claim 15 wherein the color correction matrix includes matrix coefficients that are selected by minimizing (a) the color difference between the color image signals and the human visual system and (b) the level of signal noise in the color image signals.

17. (Original) The method as claimed in claim 15 whereby the conditions that the areas under the color matching functions, as (a) determined by the summation of all negative lobes be minimized and (b) determined by the overlap between the green and red sensitivity curves be minimized, are constrained by the requirement that the largest possible color gamut is maintained in the output color image.

18. (Original) The method as claimed in claim 15 wherein the spectral responses of the optical section and the imaging section are selected so as to cascade together to provide all-positive, Gaussian system curves modeled upon said red, green and blue color matching functions.